NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202-453-8400

For Release:

NOTE TO EDITORS

September 4, 1985
9:00 a.m. EDT

Attached is a speech on robotics and automation that NASA Administrator James M. Beggs will deliver Sept. 4 in Washington, D.C. He will speak at 9 a.m. EDT at the AIAA/NASA Symposium on Automation, Robotics and Advanced Computing for the National Space Program. In this speech, Beggs states that:

o The Space Station era will require the best use of automation, robotics, and advanced computing.

o Three categories of automation and robotics application are listed for Space Station development. The first are applications crucial to the Station's basic operations. A second category would enhance the productivity of the Station but would not be mandatory for its operation. The third category of potential applications would provide a new generation of machine intelligence and robotics for an evolutionary Space Station.

o The second and third applications categories would require additional funding beyond the original $8 billion Space Station development budget.

- end -

REMARKS PREPARED FOR DELIVERY:

AIAA/NASA SYMPOSIUM ON AUTOMATION, ROBOTICS AND ADVANCED COMPUTING FOR THE NATIONAL SPACE PROGRAM

SEPTEMBER 4, 1985; WASHINGTON, D.C.

JAMES M. BEGGS
NASA ADMINISTRATOR

Thank you, Milt (Silveira), and good morning to you all. On behalf of NASA, I'm delighted to welcome you to this most important and timely symposium.

Marshall McLuhan once wrote: "It is the critical vision alone which can mitigate the unimpeded operation of the automatic."

I am pleased that this symposium will help us to focus our critical vision to do just that. As we prepare to enter the Space Station era, it is more vital than ever to seek ways to best use automation, robotics and advanced computing for our benefit on earth and in space. All three technologies will be essential to the Space Station's operation and evolution and to the future of the space program through the end of the century and beyond.

Key to this effort will be creative use of these technologies to ensure their most productive applications. For, just as people can be locked into roles that inhibit the use of their full capabilities, so can machines.

Since the dawn of the Space Age, we have been sending unmanned, automated extensions of our intelligence into space. Our manned spacecraft all have had some degree of automation as well. Current space systems incorporate a high degreee of automation, and plans for the Space Station have always called for the use of remote manipulators and advanced control devices. Indeed, the Space Station offers the opportunity to develop the exciting potential of automation and robotics to the fullest.

A new generation of these technologies could free humans in space for the jobs they do best. Over the years, we have demonstrated that people are our most important asset in space. Human intelligence and versatility have saved many a spacecraft and many a life because humans can adapt to change and to unexpected problems. Let me give you just a few examples.

When an oxygen tank exploded in April 1970 during Apollo 13's journey to the moon, engineers on the ground figured out a way to bring the crew safely back to earth. The astronauts used the small lunar module as a lifeboat and, following instructions from the ground, built an air purifier to keep themselves alive.

Fifteen months later on Apollo 15, a fender broke off the moon rover, causing the wheel to kick up so much lunar dust that it threatened the safety of Astronauts Dave Scott and James Irwin. The two fashioned a new fender from the cover of a flight data file.

In 1973, Skylab was also saved by human intervention. A micrometeorite shield tore away at launch leaving the spacecraft's hull bare to unfiltered sunlight. The shield also ripped away one solar power wing and jammed the other. Ten days later, NASA engineers had prepared the tools to salvage the lab and launched them with the Skylab 1 crew. Astronauts Charles Conrad and Joe Kerwin clipped metal with a pair of modifed garden shears to free the jammed wing and installed a parasol-like device to shade the lab.

And last year, astronauts retrieved, repaired and redeployed a satellite that malfunctioned and brought two others back for repair.

Today, we know these kind of heroics are only a forerunner of what we will be doing routinely in just a few short years when the Space Station is up and operating. Our most creative days in space lie ahead. Smart machines, controlled and managed by humans, could enhance our skills and abilities manyfold, and could extend our reach, literally, to the stars.

In 1939, Antoine Saint-Exupery wrote: "The machine does not isolate man from the great problems of nature, but plunges him more deeply into them." A new generation of automated and robotic technology to expand our abilities in space could plunge us into those problems very deeply, indeed.

So our challenge for the Space Station is two-fold: to find the best mix of humans and machines; and to integrate them into systems of high reliability to achieve greater efficiency and higher productivity.

Human genius in space is creating new drugs, stronger and lighter metals and better worldwide communications. Widespread use of robotic and automated systems could free humans in space to be even more creative and innovative. The key is to create a delicate balance of human and machine intelligence. And, if we can achieve that balance on the Space Station, clearly, the technology benefits will also flow to American industry and lead to productivity gains on earth as well.

I know Senator Garn, who was responsible for the original mandate, will agree that Congress and NASA are on the same track in our joint desire to use the Space Station to advance United States technology in automation and robotics. We also agree on the need for a concentrated research and development effort in these technologies to enhance human productivity in space.

NASA welcomes these challenges. We welcome the opportunity to stretch human capabilities in space by making machines smarter and more responsive.

We welcome the chance to better serve the complex needs of users and customers as the Space Station continues to evolve through the turn of the century and beyond. And we welcome the opening Congress gave us in July 1984 in P.L. 98-371, to put the

best brains in the country to work examining the potential for automation and robotics technologies and their future evolution for use on the Space Station.

Many of you were involved in this effort, and I thank you for your fine work. It produced two major reports: one by the NASA Advanced Technology Advisory Committee; and the other, by the Automation and Robotics Panel of the University of California's California Space Institute.

These reports affirmed our national goal of advancing automation and robotics technologies and our intention to apply these technologies to the Space Station. The committee's report set forth goals for time-phased incorporation of automation and robotics in the basic Space Station and its infrastructure. It emphasized that we could make much greater use of these technologies if research and development were accelerated in an augmented program. The committee did not evaluate funding requirements to develop the technologies for such a program, but the CalSpace panel did.

The panel suggested that additional funding amounting to 13 per cent of total Space Station costs be allocated for a strong augmented applications research program. It believes the minimum acceptable level would be an additional seven per cent of total costs. The panel argued that such an augmented program would incorporate automation and robotics technology at a much faster pace than the basic program would. The result would be progressively greater productivity from the Station as it evolves. NASA agrees with that assessment.

Those two reports, along with a set of six supporting studies done by five aerospace contractors and SRI International, have been provided to all our Phase B contractors. We expect our contractors to be guided by them as they continue the definition and preliminary design of Space Station elements. Indeed, we have required that the contractors submit automation and robotics plans to us as one of their products. And we will continue to monitor their progress and report to Congress semi-annually as work proceeds.

We are very pleased and encouraged by our contractors' strong and positive response. They are integrating automation and robotics into their work. And when Phase B is completed in January 1987, we are confident that our cost models will include projections for automation and robotics applications for the Space Station.

The first category of these applications will be crucial to the station's basic operations. They will be included in the development estimate we will submit to OMB and the Congress.

A second category would enhance the productivity of the Space Station, but would not be mandatory for its operation. We intend to recommend some applications from this category as part of our development program.

The third category of potential applications would provide a new generation of machine intelligence and robotics for an evolutionary Space Station. The research and technology development recommended by the Automation and Robotics panel would lead to these major advances, which would also have a great impact on terrestrial industries.

Clearly, if we were to include all of the applications in the second category and all in the third, we would need additional funding beyond our original $8 billion development budget for the Space Station.

To put it another way, if Congress wants us to wrap our arms around this activity and "go for it," we will do so gladly. But we will have to spend more than our original estimate. The Automation and Robotics Panel estimates it could cost from 7 to 13 per cent more. But we really do not know for sure at this point.

What we do know is that such an additional investment would be well-spent. At a time when we face increasing competition in the commercial use of space, we would reap substantial returns in greater Space Station productivity. And the transfer of advanced expert systems back to our economy on earth could result in major productivity improvements, not only in basic industries, but also in health care, transportation, communications and many other fields.

For more than two and one-half decades, NASA and our partners in industry and academia have taken on many challenges. Our work has pushed back knowledge frontiers on earth and in space. It has made the unknown known and the impossible possible.

The Space Station will give us the opportunity to take on even greater challenges and to push those frontiers back still further. New technological breakthroughs - discoveries we can hardly imagine today - one day could become realities to benefit all mankind.

Indeed, the possibilities are limited only by our own courage and imagination.

In Shakespeare's "Measure for Measure," Lucio says:

"Our doubts are traitors
And make us lose the good we oft might win
By fearing to attempt."

When confronted with great challenges, this great nation has never feared to attempt. And I believe we will continue to push on, across the frontiers of the unknown, with courage and conviction.

As people who are free to think, free to explore, free to dream and free to transform our dreams into realitiy, we can do no less.

Thank you very much.